

Borehole

**50-03-08****Log Event A****Borehole Information**

Farm : <u>T</u>	Tank : <u>T-103</u>	Site Number : <u>299-W10-127</u>
N-Coord : <u>43,634</u>	W-Coord : <u>75,800</u>	TOC Elevation : <u>Unknown</u>
Water Level, ft : <u>80.5</u>	Date Drilled : <u>2/28/1974</u>	

**Casing Record**

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.237</u>	ID, in. : <u>4</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>91</u>	
Type : <u>Steel-welded</u>	Thickness, in. : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>91</u>	

Cement Bottom, ft. : 91      Cement Top, ft. : 0

**Borehole Notes:**

Borehole 50-03-08 was drilled in February 1974 to a depth of 91 ft with 6-in. casing. In August 1980, the 6-in. casing was perforated from 0 to 20 ft and 89 to 91 ft. A 4-in. casing liner with a metal cap welded on the bottom was positioned inside the 6-in. casing. The entire annulus between the 4-in. and 6-in. casings was stemmed with 109 gal of grout. The thicknesses of the 4-in. and 6-in. casings are presumed to be 0.237 in. and 0.280 in., respectively, on the basis of the published thickness for schedule-40, 4-in. and 6-in. steel tubing.

**Equipment Information**

Logging System : <u>2B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency : <u>35.0 %</u>
Calibration Date : <u>10/1997</u>	Calibration Reference : <u>GJO-HAN-20</u>	Logging Procedure : <u>MAC-VZCP 1.7.10-1</u>

**Logging Information**

Log Run Number : <u>1</u>	Log Run Date : <u>03/23/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>10.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>03/24/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>9.0</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>64.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

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**50-03-08****Log Event A**

Log Run Number :	<u>3</u>	Log Run Date :	<u>03/25/1998</u>	Logging Engineer:	<u>Alan Pearson</u>
Start Depth, ft.:	<u>87.0</u>	Counting Time, sec.:	<u>200</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>71.5</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Log Run Number :	<u>4</u>	Log Run Date :	<u>03/30/1998</u>	Logging Engineer:	<u>Alan Pearson</u>
Start Depth, ft.:	<u>71.0</u>	Counting Time, sec.:	<u>200</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>53.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

**Logging Operation Notes:**

This borehole was logged by the SGLS in four log runs using a 200-s counting time. Between March 23 and 25, 1998, log runs one through three were performed using the Gamma 2B detector. Logging of the borehole was terminated during log run three, when the detector hit an obstruction in the borehole causing the wires in the cable head to break. As a result, log run four was performed using the Gamma 1B detector on March 30, 1998.

The top of the borehole casing, which is the zero reference for the SGLS, is approximately flush with the ground surface. The total logging depth achieved was 87.0 ft.

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**Analysis Information**

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Analyst : E. LarsenData Processing Reference : MAC-VZCP 1.7.9Analysis Date : 11/02/1998**Analysis Notes :**

The pre-survey and post-survey field verification for each logging run met the acceptance criteria established for peak shape and system efficiency. However, log run three was terminated prematurely when the tool encountered an obstruction in the borehole. As a result, the post-survey field verification could not be performed because the wiring in the cable head of the Gamma 2B detector was damaged. For log runs one, two, and four, the energy calibration and peak-shape calibration from the accepted calibration spectrum that most closely matched the field data were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation. The pre-survey calibration spectrum was used in the processing the spectra acquired during log run three.

This borehole was completed with 4-in.- and 6-in.-diameter casings along the entire logged interval. A casing correction factor for a 0.50-in.-thick steel casing was applied to the concentration data because it most closely matched the 0.517-in. total combined thickness of the 4-in. and 6-in. casings. The entire annulus between the 4-in. and 6-in. casings is likely filled with grout, making it impossible to produce accurate radionuclide assays. However, man-made and natural radionuclides were identified and apparent concentrations are reported.

Approximately 6.9 ft of water has collected inside the bottom of this borehole. The appropriate water correction factor was not available, so no compensation was applied, resulting in lower reported man-made and natural radionuclide concentration values along the water-filled interval.



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**Log Plot Notes:**

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

Both the Gamma 1B and Gamma 2B logging systems were used to log the segment of the borehole from 53 to 64 ft. A comparison plot of the naturally occurring radionuclides using the overlapping segment of each data set is included.

**Results/Interpretations:**

The radionuclide concentrations identified in this section are reported as apparent concentrations only and are underestimated.

The man-made radionuclide Cs-137 was detected by the SGLS. The Cs-137 contamination was detected continuously from the ground surface to a depth of 2 ft.

A slight peak in the K-40 and U-238 concentrations occurs at about 47 ft. The Th-232 concentration values increase at about 78 ft and remain elevated to the bottom of the logged interval (87 ft).

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank T-103.